NSLS Online News... January 30, 2001

The following news briefs are sent to you by the National Synchrotron Light Source at Brookhaven National Laboratory, Upton, New York **nslsweb.nsls.bnl.gov**

Last Call for General User Proposals Deadline January 31, 2001

Proposals and Requests for Beam Time are being accepted for the May through August, 2001 cycle at NSLS. Complete proposal packages must be received by User Administration no later than 5 p.m. (EST) on January 31. For forms, go to:

http://nslsweb.nsls.bnl.gov/nsls/users/procedures/proposals.htm

NSLS Town Meeting February 7, 2001

The NSLS Users' Executive Committee (UEC) invites you to a Town Meeting of the NSLS user community and staff on February 7 from 1:00 to 3:00 p.m. in the NSLS Seminar Room. This informal gathering provides a forum where representatives of the UEC and staff can discuss issues of interest with members of the user community. Members of the UEC and Light Source staff will be in attendance to discuss user issues. All are invited to address any issues or concerns. Please contact Mark Chance, User Executive Committee Chairperson, at mrc@aecom.yu.edu or 718-430-4136 if you would like an item added to the agenda.

Town Meeting Agenda

Introduction, Mark Chance (AECOM, UEC Chair)
NSLS Acting Chairman's Report, Erik Johnson for Sam Krinsky (NSLS)
E-500 Update, Steve Ehrlich (BNL/NSLS)
New Initiatives for the NSLS, Richard Osgood, Jr. (BNL)
Energy Recovery LINAC, Ilan Ben-Zvi (BNL/NSLS-ATF)
Users' Meeting Update, Simon Bare (UOP)
User Issues and Computer Security, Mary Anne Corwin (NSLS) and Mark Chance (AECOM, UEC Chair)

Mimicking Conditions at the Center of the Earth

By Diane Greenberg, BNL

At the National Synchrotron Light Source (NSLS), researchers are using a newly modified instrument — a diamond anvil with a beryllium gasket — to exert high pressure on transition metals, such as iron, cobalt, and chromium, to study their electronic structure. To understand the geophysics of the earth, the scientists hope to mimic the conditions at the center of the earth, where such transition metals are under extremely high pressure. Chi-Chang Kao, a physicist in the NSLS Department, will explain this research in more detail in the Brookhaven Lecture on Wednesday, January 31, at 4 p.m. in Berkner Hall. The title of the lecture is "A Softer X-Ray View Into the Diamond Anvil Cell: Electronic Structure of Materials Under High Pressure." David Mao of the Carnegie Institute invented the diamon-danvil method in the 1960s, but, until this time, only high-energy x-rays or lasers were used for light source studies. With Mao, Kao recently designed a beryllium gasket for the anvil. Then, Kao and James Ablett, University of London, developed micro-focusing optics to focus the x-rays into the diamond anvil cell. These modifications to the diamond anvil enabled Kao to use softer x-rays for x-ray spectroscopy studies, thus enabling him to determine the electronic structure of the transition metals under high pressure. A month after earning his Ph.D. in chemical engineering from Cornell University in 1988, Kao started as a postdoctoral research associate at BNL. He became an assistant physicist in 1990, associate physicist in 1992, and physicist in 1994. He was awarded tenure in 1997.

NSLS Annual Users' Meeting May 21-24, 2001

The NSLS Annual Users' Meeting is a forum for reporting new research results and advances in experimental capabilities that utilize synchrotron radiation. The NSLS community includes both scientists who only occasionally use the NSLS to supplement a laboratory-based research program and those whose programs are based at one or more NSLS beamlines. The meeting brings together scientists from many diverse disciplines to share their recent accomplishments and visions of the future. It also provides them with the opportunity to visit with old friends and to forge new relationships.

Because the focus of our meeting is on the science produced at the NSLS, we especially encourage the infrequent or new synchrotron user to attend. Through workshops, invited talks, the poster session, and the informal interactions, there will be numerous opportunities to learn about new frontiers in synchrotron-based experimentation and how these will impact your research interests.

The Users' Meeting is an ideal time to interact with the wide variety of scientists who make the NSLS a most productive user facility. Below are brief descriptions about each workshop. Full details about the meeting and workshops (including speakers and their topics) can be found at the following website: **nslsweb.nsls.bnl.gov/nsls/users/meeting**. We hope to see you at this year's meeting, May 21-24.

About the Workshops . . .

May 21, **Environmental Molecular Sciences** (organized by Richard Reeder/SUNY Stony Brook and Tony Lanzirotti/Univ. of Chicago). Synchrotron radiation sources provide a unique and powerful set of tools in the field of environmental sciences that is revolutionizing our understanding of environmental processes at the molecular scale. The superior intensity and spectral properties of synchrotron radiation, ranging from the infrared to the hard x-rays, enhance the potential of spectroscopy, microscopy, and diffraction methods far beyond the limits set by conventional radiation sources. Although the physics, materials science, and biological communities have made extensive use of synchrotron facilities, the use of synchrotron radiation for environmental studies is still relatively new. There is thus a clear need for ongoing interaction between interested researchers to promote the exchange of new ideas, attract new environmental researchers to these facilities and provide a forum to stimulate innovations in techniques and methodologies. The "Environmental-Molecular Sciences Workshop" is an effort to fill this niche with an emphasis on advances in instrumentation and techniques and on innovative environmental studies.

May 21, **Catalysis Research using Synchrotron Radiation** (organized by Jiangguan Chen/Univ. Delaware). The objective of the workshop is to increase the awareness and to expand the future utilization of synchrotron facilities for catalytic studies. The Speakers, from academic, industrial, and national laboratories, will present their recent results on the in-situ and time-resolved capabilities of the synchrotron techniques for a wide range of catalytic studies. Also planned is a round-table discussion, with invited representatives both from NSLS and government funding agencies, to explore ways to attract more beamline users from the catalysis community.

May 21, **Frontiers in Structural Biology at High-Brightness X-Ray Sources** (organized by Mike Becker & Lonny Berman/BNL). This symposium will focus on (a) evolving X-Ray structural methods in biology (single particles, monolayers, macromolecular folding, and other time-dependent phenomena) that depend on current high-brightness synchrotron sources, and that may be expected to undergo even greater advances with future potential higher-brightness, pulsed X-ray sources, such as hard X-Ray Free Electron Lasers or Photoinjected Energy Recovering Linacs, and (b) new or recent structures of some extremely important membrane proteins by current X-Ray methods, which typically require synchrotron beamlines for satisfactory structure solution, and which are a class of proteins that are notoriously difficult for overall structure determination by any method.

May 23, **Advanced Methods and Tricks of EXAFS Data Modeling** (organized by Anatoly Frenkel/Univ. Illinois). With the development of the *ab initio* theories and data analysis techniques, EXAFS method is evolving in a routine materials characterization method, on a par with other well established structural techniques. The goal of this workshop is to demonstrate how to make the most use of the experimental EXAFS signal via smart modeling (beyond the trivial first-shell analysis) and yet not to overinterpret the data. In addition, many common mistakes in the data analysis and some common examples of unphysical interpretations of the data, which are often overlooked, will be discussed. The workshop is intended for the broad audience of synchrotron users from all fields of materials science, physics, chemistry, biology, environmental science, engineering etc. who specialize in EXAFS.

May 23, **Nanotechnology: Opportunities in Synchrotron Radiation** (organized by Peter Johnson/BNL Physics and Chi-Chang Kao/BNL NSLS). Nanoscience and technology have attracted considerable attention recently. Indeed they are thought by some to be engine driving the next industrial revolution. The wide range of experimental tools at the NSLS has been extremely valuable in the characterization of bulk samples, and will certainly play an important role in nanoscience and technology. The goal of the workshop is to bring together researchers in nanoscience and experts in synchrotron techniques to explore this exciting opportunity. The scope of the workshop includes synthesis of novel nanomaterials, characterization of nanomaterials with synchrotron and other techniques, and the study of the growth of nanomaterials. In addition, there will be a session at the end of the workshop for participants to discuss their plans in nanoscience, to promote collaborations, and to identify the critical areas in synchrotron technique development.

May 23/24, **IR Micro-Spectroscopy: A Molecular Probe with Micron Resolution** (organized by Larry Carr and Lisa Miller/BNL NSLS). Synchrotron light provides an excellent infrared source for micro-spectroscopy because of its high brightness and broadband nature. Using synchrotron IR micro-spectroscopy, high quality spectra can be collected at the diffraction limit, which is 2-20 microns in the mid-infrared region. This workshop will focus on the benefits of using synchrotron radiation for infrared micro-spectroscopy in many fields of research, including medicine, biology, chemistry, geology, the environment, polymers, and material science. In addition, new techniques for improving spatial resolution will be presented that take advantage of the high brightness of the synchrotron IR source. The NSLS has 6 infrared beamlines, with 3 operating IR microscopes, which will be available for the 2 days that follow the workshop. So if you have a sample you'd like to examine, bring it along!

May 24, **XAFS data reduction and analysis using WinXAS** (organized by Thorsten Ressler, the developer of WinXas/Fritz-Haber-Institut der Max-Planck-Gesellschaft, Berlin) is a hands-on EXAFS analysis session in the Use of WinXAS. The workshop will focus on the use of the WinXAS software for XAFS data reduction and analysis. Emphasis is put on the graphical user interface to perform both conventional data reduction and advanced data analysis (PCA, higher shells refinement). Examples will be demonstrated step-by-step "on line" (laptop and "beamer") and come from the research areas of materials science, inorganic chemistry, and heterogeneous catalysis. Participants may bring their own laptops and follow the given examples (hands-on, software and data provided). Specific user questions will also be addressed. The workshop is intended for all XAFS users (beginners and experts) who seek convenient and rapid reduction of piles of experimental data and value graphically aided data analysis.

FTP Site for Research Data Transfer

An FTP site has been set up for users to transfer research data files back to their institution created while performing experiments at the NSLS. No special access is needed and you log on anonymously. For more information, speak with a beamline staff member or contact NSLS User Administration.

User Obligations and Reminders

Pre-Registration: All users must pre-register for each visit.
http://nslsweb.nsls.bnl.gov/nsls/dbforms/user-regis.asp

Foreign Nationals: All foreign nationals must submit Form BNL-473. Those without active appointments must arrive Monday-Friday by 3 p.m. (no weekends/holidays).
http://nslsweb.nsls.bnl.gov/nsls/users/procedures/foreign.htm

Training: All users who require training/retraining must arrive Monday-Friday by 3 p.m. (no weekends/holidays).

Publication References: Users (except proprietary) are obligated to submit references for all published work.
http://nslsweb.nsls.bnl.gov/nsls/pubs/pubrefs/Default.htm

Abstracts: Users are obligated to submit abstracts.
http://nslsweb.nsls.bnl.gov/nsls/pubs/abstracts/submit.asp

End of Run Form: All users are asked to complete the End of Run survey at the end of each experimental run.
http://nslsweb.nsls.bnl.gov/nsls/dbforms/end-of-run.asp

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